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2832/90 29 November 1990 (29.11.90) DK(71) Applicant (for all designated States except US): MASKIN-
FABRIKEN TAARUP A/S [DK/DK]; Taarup Strand-
vej, DK-5300 Kerteminde (DK).

(72) Inventor; and

(75) Inventor/Applicant (for US only): LAURITZEN, Georg
[DK/DK]; Heibergsvej 23, DK-5300 Kerteminde (DK).(74) Agent: HOFMAN-BANG & BOUTARD A/S; Adelgade
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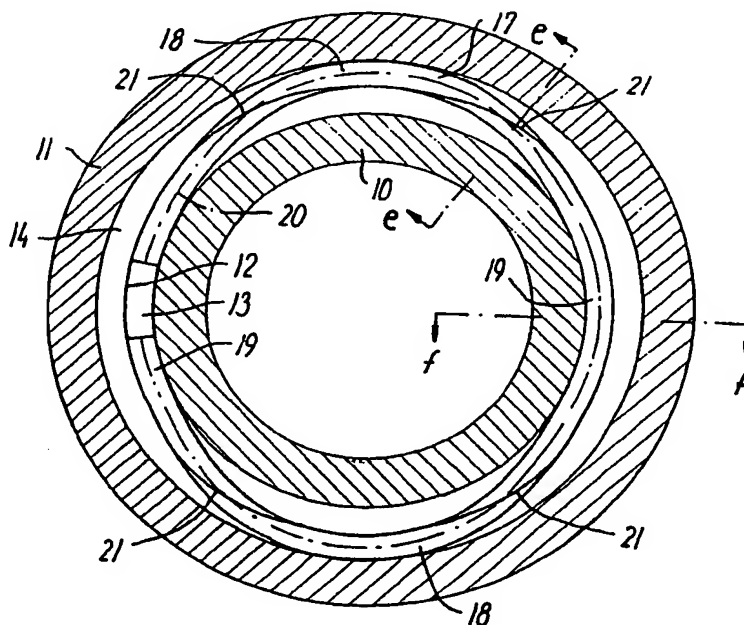
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With international search report.

With amended claims.

In English translation (filed in Danish).

(54) Title: COUPLING MEANS



(57) Abstract

A substantially C-shaped resilient coupling means (17) for mounting in a ring-shaped space, which is formed by two oppositely positioned grooves (13 and 14) in mutually engaged cylindrical faces (12) on two coaxial parts (10 and 11), has a shape different from a circular arc shape so that some parts of the coupling means will be positioned entirely in the one groove and other parts in the other groove. The force necessary for cutting the coupling means when the two parts (10 and 11) are to be disassembled, is hereby reduced greatly because of the established reduction of the cutting zone (21).

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⁺ Any designation of "SU" has effect in the Russian Federation. It is not yet known whether any such designation has effect in other States of the former Soviet Union.

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Coupling means

The invention concerns a substantially C-shaped, resilient
5 coupling means of the type stated in the introductory
portion of claim 1. The known coupling means of this type
substantially have the shape of circular arcs and will
frequently be so positioned in the space defined by the
10 grooves that at any rate long extent thereof are present
in the dividing face between the two parts. When these
parts are to be disassembled, e.g. with a view to
replacement of one part, which may e.g. be a ball bearing,
the coupling means has to be cut through. This takes place
15 by the scissors effect which is produced when the two
parts are pressed away from each other. When the coupling
means is positioned in the groove space as described
above, cutting will take place substantially "longitudi-
nally" or rather along the periphery and over long extent
20 substantially along a diameter of the cross-section, i.e.
it is a large amount of material which has to be cut
through.

When, according to the invention, the coupling means is
constructed as stated in the characterizing portion of
25 claim 1, the cut amount of material is greatly reduced and
cutting is correspondingly easier to perform.

When the coupling means has such a shape as is stated in
claim 2, its central line intersects the dividing face
30 between the two parts at four points, and cutting will
then take place along relatively short faces positioned
around these points.

The invention will be explained more fully below with
35 reference to the drawing, in which

- 2 -

fig. 1 shows an axial section through two coupled cylindrical parts with ring-shaped grooves in which a substantially C-shaped coupling means of ordinary known type is positioned,

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fig. 2 shows a section along the line a-a in fig. 1,

fig. 3 shows a section analogous to that of fig. 1, but with a coupling means of the invention positioned in the grooves,

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fig. 4 shows a section along the line c-c in fig. 3, and

figs. 5 and 6 show sections along the lines e-e and f-f, respectively, in fig. 4.

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In the drawing, 10 and 11 are two coaxial ring-shaped parts which are coupled together along coaxial, cylindrical faces 12. The inner part 10 may e.g. represent a ball bearing and the outer part 11 a means which is rotatably journaled by means of the ball bearing. In the cylindrical faces 12 engaging each other, the parts have oppositely positioned ring-shaped grooves 13 and 14, respectively, which mount a resilient, substantially C-shaped coupling means 15 which prevents relative axial movements of the two parts.

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As shown in fig. 2, the known coupling means 15 is substantially circular when it is positioned in the ring-shaped space formed by the grooves 13 and 14, and engages the bottom of the outer groove 14 substantially along its entire periphery under the action of its own spring force.

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When the two parts 10 and 11 are to be disassembled, e.g. with a view to replacement of a ball bearing, the coupling means 15 must necessarily be cut through, which takes

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place by pressing the parts away from each other in the axial direction such that cutting takes place at the groove edges. The cutting zone is shown at a dotted line 16 in fig. 2, and it will be seen that this zone extends through the entire length of the coupling means and even extends along a diameter of the cross-section, so that it is a large amount of material which has to be cut through, which requires a correspondingly great force.

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10 Figs. 3-6 show the same two parts 10 and 11 with ring grooves 13 and 14 and a cylindrical engagement face 15, like in figs. 1 and 2, but with a coupling means 17 according to the invention positioned in the grooves. This coupling means is substantially oval so that two diametrically oppositely positioned portions 18 of the means are present in the outer groove 14 alone, and two other diametrically oppositely positioned portions 19 separated about 90° from the first ones are present in the inner grooves 13 alone. The dividing line 20 of the coupling means which is shown in dotted form, thus intersects the engagement face 15 at four points and the cutting zone is reduced to and divided into four relatively short subzones 21 positioned around the four points of intersection. Each subzone passes obliquely through the coupling means and thus through the thickest portion thereof only at a single point.

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It will be seen that the use of the coupling means 17 of the invention results in a great reduction of the amount of material which has to be cut through when the two parts 10 and 11 are to be disassembled, and thus a corresponding reduction in the force required for the cutting.

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The invention is not restricted to the special embodiment shown and described above, since the coupling means does not have to be oval, but may e.g. be wave-shaped or

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meander-shaped.

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P a t e n t C l a i m s :

1. A substantially C-shaped resilient coupling means for
5 locking two parts having mutually engaged, cylindrical,
coaxial faces in an axial direction when mounted in a
space defined by two oppositely positioned grooves in the
two faces, c h a r a c t e r i z e d in that in relaxed
state the coupling means has such a shape different from a
10 circular arc shape that some parts of the coupling means,
after mounting in said space, will be present in the one
groove and other parts in the other groove.
2. A coupling means according to claim 1,
15 c h a r a c t e r i z e d in that when relaxed it forms
the greater part of an oval.

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AMENDED CLAIMS

[received by the International Bureau on 27 March 1992 (27.03.92);
original claims 1 and 2 amended;
new claim 3 added; (1 page)]

1. A device for locking to parts having mutually engaged,
5 cylindrical coaxial faces in an axial direction by means
of a substantially C-shaped, resilient coupling means,
which is mounted in a space defined by two oppositely
positioned grooves in the two faces in a manner such that
10 the two parts can be disassembled by cutting through the
coupling means by relative axial movement of the two
parts, c h a r a c t e r i z e d in that the coupling
means has a shape different from a circular arc shape and
the grooves have a depth with respect to the thickness of
15 the coupling means in a radial direction such that some
parts of the coupling means are present entirely in the
one groove and other parts entirely in the other groove.

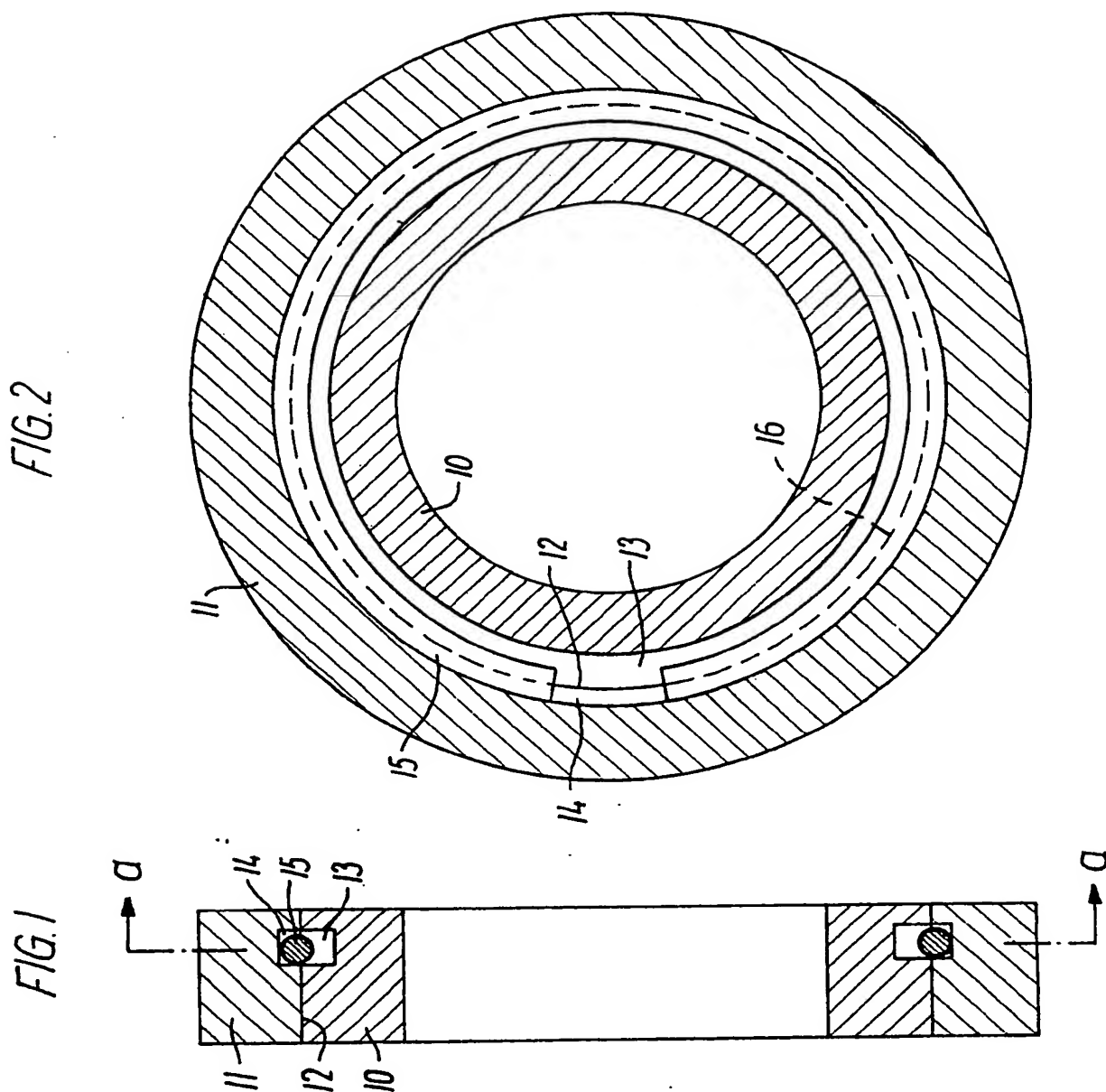
2. A device according to claim 1, c h a r a c t e r -
i z e d in that when relaxed the coupling means forms the
20 greater part of an oval.

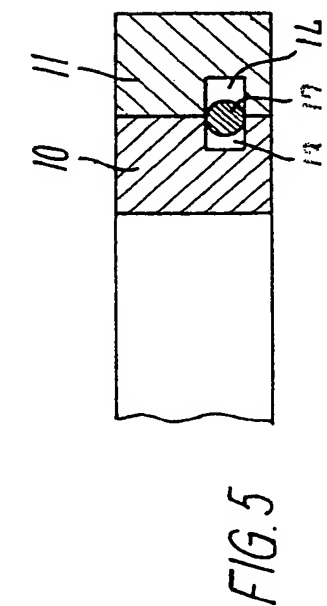
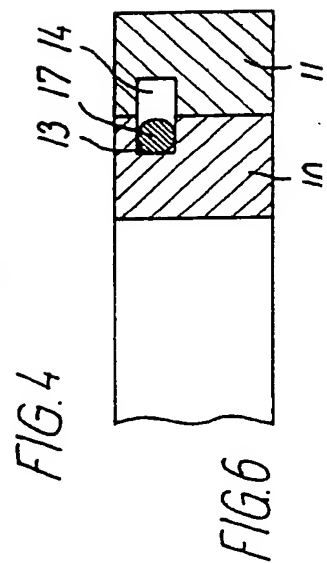
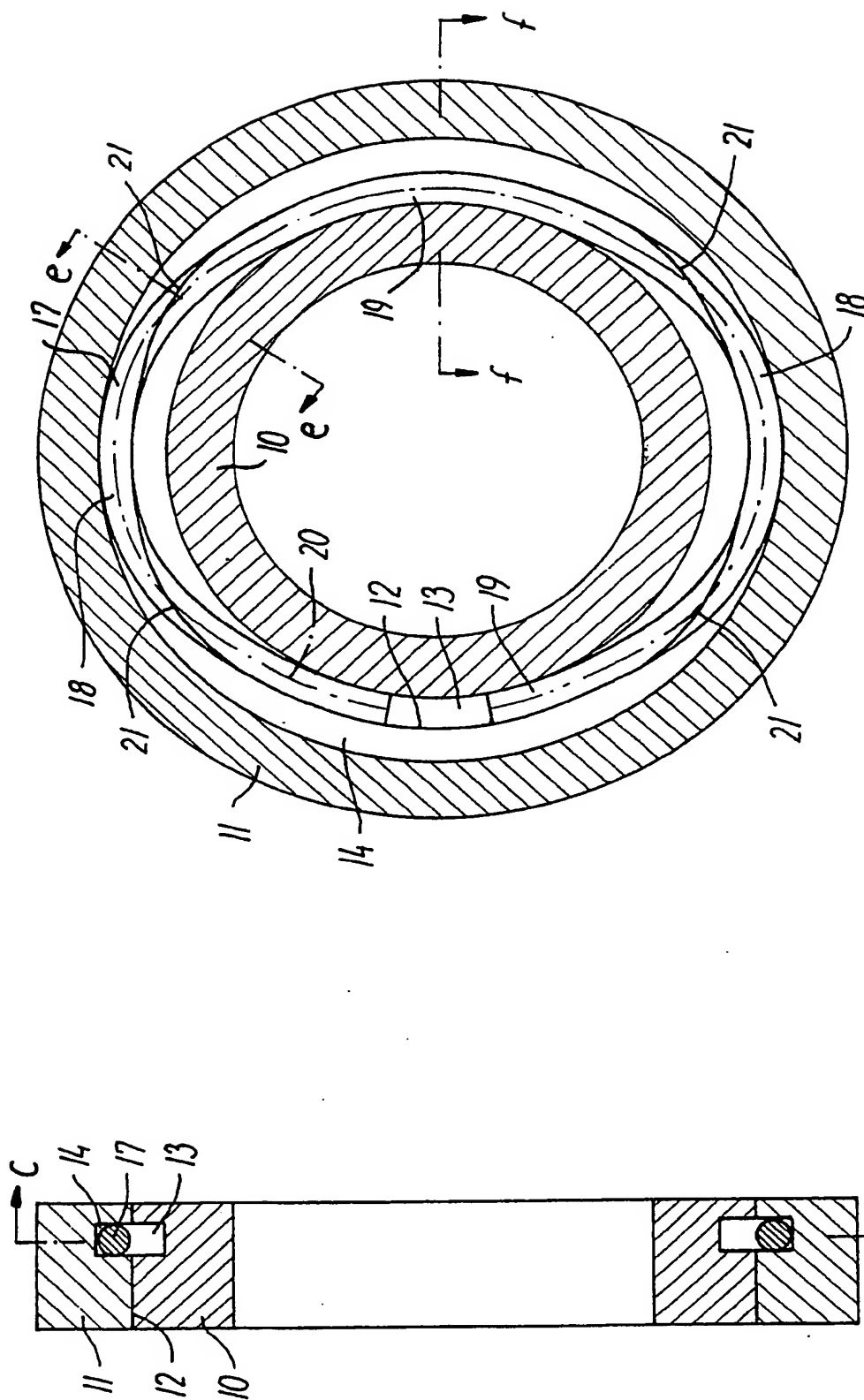
3. A device according to claim 1, c h a r a c t e r -
i z e d in that the coupling means is wave-shaped.

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INTERNATIONAL SEARCH REPORT

International Application No PCT/DK 91/00359

I. CLASSIFICATION OF SUBJECT MATTER (If several classification symbols apply, indicate all)⁶
According to International Patent Classification (IPC) or to both National Classification and IPC
IPC5: F 16 B 21/18, F 16 D 1/06

II. FIELDS SEARCHED

Minimum Documentation Searched ⁷	
Classification System	Classification Symbols
IPC5	F 16 B; F 16 D; F 16 L

Documentation Searched other than Minimum Documentation
to the Extent that such Documents are Included in Fields Searched⁸

SE,DK,FI,NO classes as above

III. DOCUMENTS CONSIDERED TO BE RELEVANT⁹

Category [*]	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³
X	FR, A, 1497512 (GLAENZER SPICER) 13 October 1967, see figures 5,6,7; claims 1-2 --	1-2
X	GB, A, 2201223 (ROLLS-ROYCE PLC) 24 August 1988, see page 2; figure 5 --	1-2
X	US, A, 3540760 (PAUL J. MILLER ET AL) 17 November 1970, see abstract; figures 1-3 --	1-2
X	US, A, 4934888 (CORSMEIER ET AL) 19 June 1990, see figures 3-5 -- -----	1

*** Special categories of cited documents:¹⁰**

- "A" document defining the general state of the art which is not considered to be of particular relevance
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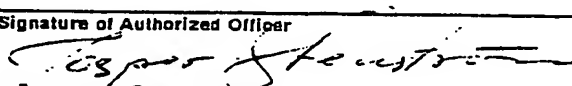
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IV. CERTIFICATION

Date of the Actual Completion of the International Search 14th February 1992	Date of Mailing of this International Search Report 1992-02-19
International Searching Authority SWEDISH PATENT OFFICE	Signature of Authorized Officer  Jesper Stenstrom

**ANNEX TO THE INTERNATIONAL SEARCH REPORT
ON INTERNATIONAL PATENT APPLICATION NO. PCT/DK 91/00359**

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report. The members are as contained in the Swedish Patent Office EDP file on 30/12/91. The Swedish Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
FR-A- 1497512	67-10-13	NONE	
GB-A- 2201223	88-08-24	DE-A- 3804560 FR-A- 2611006 JP-A- 63203910	88-09-01 88-08-19 88-08-23
US-A- 3540760	70-11-17	NONE	
US-A- 4934888	90-06-19	DE-A- 3828682 FR-A- 2625270 GB-A- 2214256 JP-A- 1176809	89-07-06 89-06-30 89-08-31 89-07-13